

### **REMARKS**

Reconsideration of this application is respectfully requested in view of the foregoing amendment and the following remarks.

Claims 7, 11, and 13 were pending. By the foregoing Amendment, claim 7 has been amended without introducing new matter. Thus, claims 7, 11, and 13 remain pending in the application and are subject to examination, of which claims 7 and 11 are independent claims.

In the Office Action mailed May 8, 2007, the Examiner maintained her former position: claim 7 was rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent No. 6,531,405 to Wegleiter ("Wegleiter") in view of U.S. Patent No. 4,914,667 to Blonder et al. ("Blonder") and claims 11 and 13 were rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Wegleiter in view of Blonder, and further in view of JP57196580 to Nishiwaki et al. ("Nishiwaki"). To the extent that the rejections remain against the claims as pending, Applicants hereby traverse the rejections as follows.

Claim 7, as amended, recites a light emitting diode comprising a pellet, a major front surface, of which where an electrode is formed, is made of a GaAsP mixed crystal, characterized in that the major front surface is a rough surface, and that all side surfaces of the pellet are rough surfaces, wherein the rough surfaces are formed with fine projections by treating the pellet with an etching solution of an aqueous solution containing Br<sub>2</sub>, nitric acid, hydrofluoric acid and acetic acid, or I<sub>2</sub>, nitric acid, hydrofluoric

acid, and acetic acid, and wherein each of the fine projections has a diameter in a range of 0.3  $\mu\text{m}$  to 3  $\mu\text{m}$ . Similar features of the pellet are also included in claim 11.

None of Wegleiter, Blonder, and Nishiwaki, when taken singly or in combination thereof, teaches or suggests all of the limitations of amended claim 7 and claim 11 as described above.

Wegleiter, as described in col. 4, lines 17-28, treats free surface of a layer sequence with an etching solution having the composition  $\text{H}_2\text{SO}_4:\text{H}_2\text{O}_2:\text{H}_2\text{O}$  in a first etching step and with hydrofluoric acid (HF) in a second etching step. The first etching step is used to remove mechanical damage induced by dicing, and thus, has nothing to do with roughening the surface of the pellet. The specification of the present application has explained such etching step as seen at, for example, line 23 of page 8 to line 1 of page 9. The second etching step, on the other hand, is used to roughen the surface of the pellet.

It is clear that Wegleiter specifies that the second etching step has to be done in a HF etching solution. There is no disclosure in Wegleiter explicitly or implicitly that the second etching step is or may be performed in a etching solution of an aqueous solution containing  $\text{Br}_2$ , nitric acid, hydrofluoric acid and acetic acid, or  $\text{I}_2$ , nitric acid, hydrofluoric acid, and acetic acid. Furthermore, Wegleiter fails to teach or suggest that each of the fine projections formed on the major front surface and all of the side surfaces of the pellet has a diameter in a range of 0.3  $\mu\text{m}$  to 3  $\mu\text{m}$ .

To support his assertions, the Examiner alleged that Blonder discloses the feature of fine projections having a diameter in a range of 0.3  $\mu\text{m}$  to 3  $\mu\text{m}$ . Applicants respectfully disagree at least based on the grounds that Blonder is not related to a light emitting diode

and its manufacturing process, and Blonder is not related to a wet etching process for roughing the surfaces of a pellet. The Examiner indicated that Blonder teaches a fine projection having a diameter in a range of 0.3  $\mu\text{m}$  to 3  $\mu\text{m}$  at col. 4, lines 20-24. Indeed, Blonder only describes a waveguide layer 23 having rib structure and the width of the rib may be approximately 3 micrometers. Such rib structure, however, is conveniently made by deposition of a 120-nanometer layer, followed by etching of a mesa in the presence of a photodefined mask covering the rib. Such rib structure clearly is not the fine projection structure recited in amended claim 7 and claim 11.

The Examiner further asserted that Nishiwaki teaches an etching solution containing  $\text{Br}_2$ , nitric acid, hydrofluoric acid and acetic acid, or  $\text{I}_2$ , nitric acid, hydrofluoric acid, and acetic acid. Applicants again respectfully disagree. From the English Abstract of Nishiwaki, the etching solution contain  $\text{Br}_2$ , nitric acid, and water but not  $\text{Br}_2$ , nitric acid, hydrofluoric acid and acetic acid, or  $\text{I}_2$ , nitric acid, hydrofluoric acid, and acetic acid, as recited in amended claim 7 and claim 11. Furthermore, in Nishiwaki, the etching solution is used for etching InP and InGaAsP, that are different from a GaAsP mixed crystal, as recited in amended claim 7 and claim 11.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some reason, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP §2143. As mentioned above, none of

Wegleiter, Blonder, and Nishiwaki, when taken alone or in any combination, teaches or suggests all the elements of amended claim 7 and claim 11. Furthermore, as Blonder is not related to a light emitting diode and the etching solution of Nishiwaki is not used in etching a GaAsP mixed crystal, it would not have been obvious for one skilled in the art to combine these prior art references to achieve the light emitting diode of amended claim 7 and claim 11.

Accordingly, Applicants respectfully submit that amended claim 7 and claim 11 are patentable over Wegleiter in view of Blonder or in view of Blonder and Nishiwaki.

As described in the Background section of the specification, Applicants have conducted serious study to develop an etching solution for roughening at least a major front surface of a GaAsP mixed crystal.

As Claim 11 is allowable, the Applicants submit that Claim 13, which depends from Claim 11, is likewise allowable for at least the same reasons that Claim 11 is allowable, as well as for the additional subject matter recited therein.

### **Conclusion**

Applicants respectfully submit that this application is in condition for allowance and such action is earnestly solicited. If the Examiner believes that anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' undersigned representative at the telephone number listed below to schedule a personal or telephone interview to discuss any remaining issues.

In the event that this paper is not considered to be timely filed, an appropriate extension of time is requested. Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account Number 01-2300, referencing **Docket Number 107242-00005**.

Respectfully submitted,

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